CLAIMS

1. A method for network bandwidth utilization, comprising:

limiting a particular dataflow injected in a network from a dataflow source to a particular rate;

marking datapackets, at a dataflow destination, with marks that depend on the level of any intervening network congestion;

returning packet marks from said dataflow destination to said dataflow source that indicate a degree of network congestion for said particular dataflow;

increasing the rate of said particular dataflow according to an increase function if said packet marks being returned indicate no congestion; and

decreasing the rate of said particular dataflow according to a decrease function if said packet marks being returned do indicate congestion.

2. The method of claim 1, wherein:

the step of increasing is such that said increasing function can be mathematically represented as, $f_{inc}(r) = Min(r * m^{R_{\min}/r}, R_{\max})$,

where,

r is the datapacket injection rate;

$f_{inc}(r)$ is the increase function;

m is a constant greater than one;

R_{min} is the predetermined minimum injection rate;

R_{max} is a predetermined maximum injection rate; and

Min ( ) is a ceiling function.

3. The method of claim 1, wherein:

the step of decreasing is such that said decreasing function can be mathematically represented as, $f_{dec}(r) = Max(r/m, R_{min})$,

where:

$f_{dec}(r)$ is the rate decrease function; and

Max ( ) is a floor function.

4. The method of claim 1, wherein:

the step of decreasing is such that said decreasing function linearly enlarges an inter-datapacket delay.

5. The method of claim 1, wherein:

the step of increasing is such that said increasing function linearly reduces an inter-datapacket delay.

6. The network source node of claim 4, wherein:

rate increase function can be mathematically represented as:

$f_{inc}(r) = \mathrm{Min}\ (r/(1-R_{min}/R_{max}), R_{max})$

where:

r is the datapacket injection rate;

$f_{inc}(r)$ is the fast increase function;

R_{min} is the predetermined minimum injection rate;

R_{max} is a predetermined maximum injection rate; and

Min ( ) is a ceiling function.

7. The network source node of claim 5, wherein:

rate decrease function can be mathematically represented as:

$f_{dec}(r) = \mathrm{Max}\ (R_{max}/(1+R_{max}/r), R_{min})$

where:

r is the datapacket injection rate;

$f_{dec}(r)$ is the rate decrease function;

R_{min} is the predetermined maximum injection rate; and

R_{max} is a predetermined maximum injection rate; and

Max ( ) is a floor function.

8. A network, comprising:

a source node providing for content to be sent to a destination node in a dataflow comprising a series of datapackets;

a rate controller associated with the source node and able to control the rate of injection of said datapackets;

a congestion monitor associated with the destination node and providing for an assessment of whether individual said datapackets experienced network congestion in their respective individual travels from the source node to the destination node, and providing for the return of a feedback signal to the rate controller related to such assessment;

wherein, the rate controller is responsive to said feedback signal and said rate of injection of said datapackets is adjusted to minimize congestion and maximize data throughput.

9. The network of claim 8, wherein:

the congestion monitor returns an acknowledgement (ACK) datapacket to the source node for each reception.

10. The network of claim 9, wherein:

the congestion monitor is such that the return ACK datapackets are marked according to whether congestion was encountered in the delivery to the destination node.

11. The network of claim 8, wherein:

the rate controller is such that several dataflows can be independently and simultaneously controlled.

12. The network of claim 8, wherein:

the rate controller is such that increases allowed in said injection rate can be mathematically represented as, $f_{inc}(r) = Min(r * m^{R_{min}/r}, R_{max})$,

where,

r is the datapacket injection rate;

$f_{inc}(r)$ is the increase function;

m is a constant greater than one;

R_{min} is the predetermined minimum injection rate;

R_{max} is a predetermined maximum injection rate; and

Min ( ) is a ceiling function.

13. The network of claim 8, wherein:

the rate controller is such that decreases made in said injection rate can mathematically represented as, $f_{dec}(r) = \text{Max}(r/m, R_{min})$,

where:

$f_{dec}(r)$ is the rate decrease function; and

Max ( ) is a floor function.